

and disposed in the motor and actuator mechanism so as to be adapted to interact with the flange of the pump actuator.

17. The assembly of claim 16, wherein the pump hammer includes at least one actuator arm and a gear portion having a flat face.

5        18. The assembly of claim 17, the motor and actuator mechanism housing further including a stop disposed in a path of the flat face of the pump hammer to restrict the movement of the pump hammer so as to cause the motor to stall.

10      19. In a fluid dispensing system, a shank clip adapted to couple a spout and mounting shaft assembly to a motor housing and support assembly, the shank clip comprising:

      a first sidewall defining a perimeter that includes a first circular portion that defines a first radius;

15           a second sidewall defining a perimeter that includes a second circular portion that defines a second radius, wherein the second radius is greater than the first radius; and

      a bottom disposed between the first sidewall and the second sidewall to define a channel.

20      20. The shank clip of claim 19, wherein the bottom is U-shaped.

20      21. The shank clip of claim 19, wherein the second circular portion includes a first end that mates with a first curved portion and a second end that mates with a second curved portion.

22. The shank clip of claim 19, wherein the first circular portion and the second circular portion each extend over an arc that exceeds 180 degrees.

25      23. The shank clip of claim 22, wherein the arc is 240 degrees.

24. The shank clip of claim 22, wherein the second circular portion includes a first end that mates with a first curved portion and a second end that mates with a second curved portion.

5 25. The shank clip of claim 24, wherein the first sidewall, the second sidewall, and the bottom each are made from a resilient material.

26. In a fluid dispensing system, a mounting clip adapted to couple a motor housing and support assembly to a reservoir module, the mounting clip comprising:

a flange;

10 a lower plate defining a perimeter about an axis and having a plurality of protuberances that extend from the lower plate perimeter towards the axis, wherein two adjacent protuberances define a space; and

a wall disposed between the flange and the lower plate to define a channel.

15 27. The mounting clip of claim 26, further comprising:  
a stop member disposed in the channel.

28. The mounting clip of claim 27, wherein the stop member is disposed above a protuberance at a position that is adjacent to a space.

20 29. The mounting clip of claim 26, wherein the flange defines a perimeter, the flange having two opposing nubs disposed on the perimeter of the flange.

30. The mounting clip of claim 26, wherein at least one protuberance includes at least one friction surface, wherein the at least one friction surface includes an indentation at an end of the at least one friction surface.

25 31. The mounting clip of claim 30, wherein the lower plate includes an opening disposed through the lower plate.

32. A method to install a fluid dispensing system, the method comprising:

presenting a reservoir module having a container, the container defining a longitudinal axis, the reservoir module further having a pump mechanism defining a center and coupled to the container, a pump actuator defining a center and coupled to the pump mechanism, and a delivery tube having a lower end and defining a center and an axis that follows the center of the delivery tube, wherein the delivery tube extends at the lower end from the pump actuator and wherein the longitudinal axis of the container is aligned through the center of the pump mechanism, the center of the pump actuator, and the axis of the delivery tube at least at the lower end of the delivery tube;

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15 placing a spout and mounting shaft assembly through an aperture in a countertop; and

disposing the delivery tube within the spout and mounting shaft assembly.

33. The method of claim 32, further comprising:  
coupling a motor housing and support assembly between the reservoir module and the spout and mounting shaft assembly.

34. The method of claim 33, wherein coupling the motor housing and support assembly between the reservoir module and the spout and mounting shaft assembly includes mating a pump housing of the motor housing and support assembly to a support shaft of the spout and mounting shaft assembly by aligning a plurality of splines to a plurality of grooves at one of a plurality of predetermined orientation angles.

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35. The method of claim 33, wherein coupling the motor housing and support assembly between the reservoir module and the spout and mounting shaft assembly includes

presenting a shank clip having a first sidewall defining a perimeter that includes a first circular portion that defines a first radius, a second sidewall

defining a perimeter that includes a second circular portion that defines a second radius, wherein the second radius is greater than the first radius, and a bottom disposed between the first sidewall and the second side wall to define a channel,

5                   pressing the first curved portion and the second curved portion of the shank clip about a support shaft of the spout and mounting shaft assembly,

                      mating a pump housing of the motor housing and support assembly to the support shaft, and

10                  simultaneously pressing the first circular portion about a groove of the support shaft and the second circular portion about a groove of the pump housing.

36.       The method of claim 33, wherein coupling the motor housing and support assembly between the reservoir module and the spout and mounting shaft assembly includes

15                  presenting a mounting clip having a flange, a lower plate defining a perimeter about an axis and having a plurality of protuberances that extend from the lower plate perimeter towards the axis, wherein two adjacent protuberances define a space, and a wall disposed between the flange and the lower plate to define a channel,

20                  mating a pump housing of the motor housing and support assembly to the support shaft,

                      moving a plurality of tabs of a container of the reservoir module through the spaces of the adjacent protuberances, and

                      rotating the container until one of the tabs encounters a stop member disposed in the channel of the mounting clip.

25       37.      A method to dispense soap from a fluid dispensing system, the method comprising:

                     (i)     presenting a tube having a tube end disposed at a first position within an indented portion of a spout of the fluid dispensing system;

                     (ii)    sensing an object below the tube end;

(iii) in response to sensing the object, expelling soap from the tube end by drawing the tube end further within the indented portion to a second position; and

(iv) returning the tube end to the first position.

5 38. The method of claim 37, wherein returning the tube end to the first position draws soap into the tube end.

39. The method of claim 38, wherein sensing an object below the tube end includes detecting an infrared signal that is reflected off the object.

10 40. The method of claim 38, wherein drawing the tube end further within the indented portion to a second position includes activating a torque of a motor to rotate an actuator arm of a pump hammer so that the actuator arm contacts a flange on a pump actuator and urges the pump actuator downward to overcome a spring bias.

15 41. The method of claim 40 wherein drawing the tube end further within the indented portion to a second position includes stalling the motor so that the spring bias overcomes the torque of the motor to urge the pump actuator upwards.

42. The method of claim 37, subsequent to expelling soap from the tube end, the method further comprising:

20 incrementing a counter; and  
if the counter is less than 900, then returning to (ii), or  
if the counter equals 900, then at least one of lighting a low soap level light indicator and issuing an audible signal.

25 43. The method of claim 37, subsequent to (ii) sensing an object below the tube end, the method further comprising:

sensing a voltage level of a power source; and  
if the voltage is greater than 4.85 volts, then performing (iii), or

if voltage is less than 4.85 volts, then at least one of lighting a low power level light indicator and issuing an audible signal.

44. A method to perform maintenance on a fluid dispensing system, the method comprising:

5 presenting a second reservoir module having a second container, the second container defining a longitudinal axis, the second reservoir module further having a second pump mechanism defining a center and coupled to the second container, a second pump actuator defining a center and coupled to the second pump mechanism, and a second delivery tube having a lower end and defining a center and an axis that follows the center of the second delivery tube, wherein the second delivery tube extends at the lower end from the second pump actuator and wherein the longitudinal axis of the second container is aligned through the center of the second pump mechanism, the center of the second pump actuator, and the axis of the second delivery tube at least at the lower end of the second delivery tube; and

10 15 installing the second reservoir module in the spout and mounting shaft assembly.

45. The method of claim 44; further comprising:

20 presenting a first reservoir module having a first container, the first container defining a longitudinal axis, the first reservoir module further having a first pump mechanism defining a center and coupled to the first container, a first pump actuator defining a center and coupled to the first pump mechanism, and a first delivery tube having a lower end and defining a center and an axis that follows the center of the first delivery tube, wherein the first delivery tube extends at the lower end from the first pump actuator and wherein the longitudinal axis of the first container is aligned through the center of the first pump mechanism, the center of the first pump actuator, and the axis of the first delivery tube at least at the lower end of the first delivery tube,

wherein the delivery tube of the first reservoir module is disposed within a spout and mounting shaft assembly that is positioned through an aperture in a countertop; and

5 prior to installing the second reservoir module in the spout and mounting shaft assembly, removing the first reservoir module from the spout and mounting shaft assembly.